Regular review

Effect of increasing age on cataract surgery outcomes in very elderly patients

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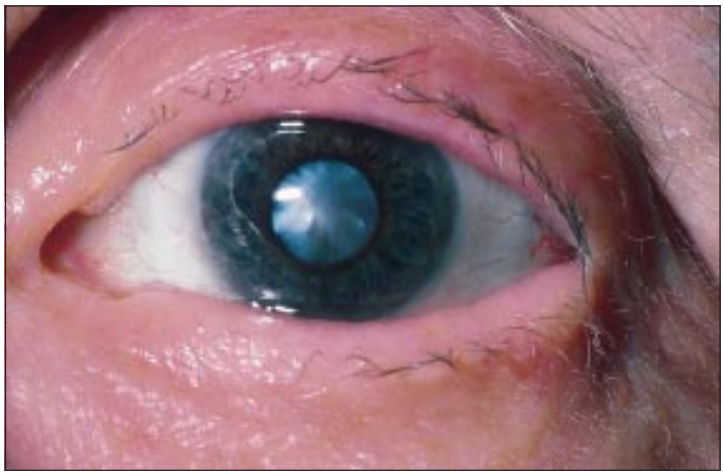
The safety and effectiveness of cataract surgery are generally well established.[1] About 90% of eyes achieve a visual acuity of 6/12 or better after cataract surgery.[2] In eyes with no pre-existing comorbidity, more than 95% can be expected to achieve this outcome. Many other studies have documented substantial improvement not only in visual acuity but also in quality of life after cataract surgery.[3–5]

In the very elderly population (say, those aged over 85 years), however, these issues are not entirely clear. In the 1997-8 UK national cataract surgery survey, more than a third of participants aged 85 years and older did not achieve visual acuities of 6/12 or better after cataract surgery.[5] These people were also two to three times more likely to have severe impairment in one eye (visual acuity of 6/60 or worse) than younger people. With greater life expectancies and increasing demand for improved quality of life, the number of very elderly people receiving cataract surgery has been projected to grow substantially in the coming years. Among people aged 85 and older in England and Wales, about 500 000 people are estimated to have cataracts with some degree of visual impairment, with 100 000 new cases of cataract every five years.[6]

Among these very elderly people, are some more likely to benefit than others? Conversely, which patients are at risk of developing adverse events? How does old age affect outcomes of cataract surgery? The answers to these questions are important not only to the elderly patient contemplating cataract surgery and the doctor deciding if cataract surgery is indicated, but also to the government, insurers, and other healthcare payers, as cataract surgery delivery is increasingly under pressure from cost containment and healthcare rationing issues.[7] Visual acuity has been seen as a criterion in prioritising cataract surgery and in determining who should receive the procedure.[8] The possibility that age may also be used as an additional factor has been raised.[9] This is a sensitive and controversial topic and should be approached carefully in an objective and scientific manner. I aimed to provide an estimate of the impact of increasing age on the safety, benefits, and risks of cataract surgery.

Summary points

- Cataract surgery is both safe and effective for the vast majority of people who need it
- The benefits and risks of cataract surgery in very elderly patients are less clear
- In these patients, especially those with concomitant cardiovascular diseases, a cautious approach is advised because of higher risks of systemic complications during surgery
- A higher prevalence of pre-existing ocular diseases—for example, age related maculopathy—may affect cataract surgery outcomes in elderly patients
- Independent of pre-existing ocular diseases, increasing age is associated with poorer cataract surgery outcomes



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Outcomes from cataract surgery may be poorer in very elderly people

Methods

I conducted an initial review of Medline from 1966 to December 2000 using the following keywords: "cataract surgery outcome" in various combinations with "effect of age," "increasing age," "older people,"

"very elderly," "complications," "mortality," and/or "pre-operative testing." I reviewed each abstract and retrieved relevant articles. Bibliographies in these articles provided further references.

Is cataract surgery safe in very elderly people?

As with any surgical procedure, the first issue concerns safety. In general, cataract surgery has had an exceptional safety record, with low mortality and morbidity associated with the procedure, since the 1970s.[10–12] With the remarkable improvement in cataract surgical techniques in recent years—leading to shorter operating time (most surgery now takes 15 minutes), more efficient anaesthesia (from general to regional to topical), and a trend towards day surgery—cataract extraction has become a "minor" surgical procedure. Occasional reports of severe medical complications can still be found in the current literature,[13] but, partly because of the rarity of these cases, the safety aspects of cataract surgery generate little research interest. In fact, the current trend towards cost recovery has even led to questions about the value of the traditional first postoperative day review[14] and of the need for routine preoperative testing—for example, electrocardiography, blood chemistry—in people with no medical indications.[15]

In very elderly people, however, a cautious attitude in recommending any elective surgery, including cataract surgery, is valid. We know that a substantial proportion of very elderly people will have concomitant cardiovascular diseases, with many of these diseases undiagnosed before cataract surgery.[16] In the UK national cataract surgery survey, nearly 60% of the patients had a medical disorder, with some having more than one.[5] In a large, multicentre US study, 75% of enrolled participants with cataract extraction had a systemic coexisting illness; 47% had hypertension; 19% had a history of angina; and 14% a history of myocardial infarction or coronary revascularisation.[15] In the same study about 30% of patients developed an adverse medical event either during or after surgery, although fortunately most were not serious—for example, transient hypertension, arrhythmia. Another study reported that nearly 1 in 3 elderly people with a history of two or more cardiovascular risk factors had intraoperative, electrocardiographically defined myocardial ischaemia, although definite myocardial infarction was rare.[17] Nevertheless, these data do suggest that, although overall morbidity associated with cataract surgery is low, we should not underestimate the potential systemic risks, especially for very elderly patients.

How effective is cataract surgery in very elderly people?

The effectiveness of cataract surgery in very elderly patients is controversial. Although many studies have documented substantial improvement in cataract surgery outcomes across the entire age range,[3–5] few studies have directly focused on very elderly people.[18 19] Paradoxically, some studies that have looked at predictive factors for cataract surgery outcomes—for example, preoperative ocular comorbidity—have often emphasised the age adjusted risks of these predictive factors. Partly because of this, and partly because age is often considered a "non-modifiable" risk factor, the impact of old age is often neglected.

MIKE SWEENEY

Outcomes related to comorbidity

Many elderly people have concomitant ocular and systemic comorbidities. In the UK national cataract surgery survey 1 in 3 participants had a pre-existing ocular condition that could significantly affect cataract surgery outcomes.[5] Age related maculopathy was present in 15% of the participants, glaucoma in 10%, and diabetic retinopathy in 3%. The prevalence of these conditions, as expected, increased with age.

The presence of ocular comorbidities has been shown to be a strong and independent predictor of poorer surgical outcomes.[5 9 20] In the UK national cataract surgery survey, people with ocular comorbidities could be expected to have 2.7 times (95% confidence interval 2.5 to 2.9 times) higher odds of having a visual acuity worse than 6/12 than someone without these conditions.[8] In a study by Schein and colleagues, people with age related maculopathy, glaucoma, or diabetic retinopathy were 2.2 times (1.3 to 3.6 times) more likely not to improve in even one of three outcomes after cataract surgery (visual acuity, a cataract symptom score, and visual function questionnaire), compared with those with none of these conditions.[20] In fact, not only is the value of cataract surgery in these people debatable, but some data have suggested that cataract extraction exacerbates many of these conditions. The increased risk in progression of diabetic retinopathy and development of macular oedema after cataract surgery in high risk patients is well known.[21] Progression in age related maculopathy after cataract extraction has also been suggested.[22]

Fewer data exist on the effects of systemic comorbidities on cataract surgery outcomes. People with a history of diabetes and stroke in the UK national cataract surgery survey had a moderate risk (odds ratio of 1.6 and 1.3 respectively) of achieving a visual acuity worse than 6/12 compared with people without such a history.[5] In another study, on 164 patients aged 70 years and over, one year functional outcomes after cataract surgery (based on an activities of daily living questionnaire) were related to baseline mental and cognitive status.[23]

Surgery complications

Increasing age is a risk factor for many cataract surgery complications—for example, rupture of the posterior capsule during surgery, postoperative infection, raised intraocular pressure, corneal oedema.[5] In one Danish study, elderly people aged 90 and older had a 3.6 times (1.5 to 8.6 times) higher risk of postoperative endophthalmitis (an uncommon but potentially blinding infection) than those aged under 90 years.[24]

Outcomes related to age

It is seldom acknowledged that age itself has a substantial impact on the results of cataract surgery—independent of the effects of comorbidities or surgery complications. Wescott and colleagues recently showed that in patients with no ocular comorbidity, the odds of achieving an acuity of 6/12 or better after cataract surgery was reduced by a factor of 4.6 (1.8 to 11.4) for patients aged 80 and over, compared with those aged 60-69, after adjustment for complications of surgery and surgeon grade.[9] In the broader UK population, people aged 90 years and over were also four times (3.1 to 5.1 times) more likely to have visual acuities worse than 6/12, compared with those aged 50-59 years, after the presence of ocular morbidity was controlled for.[5] Similarly, in Schein et al's study, people aged 75 to 95 were 3.6 times (1.3 to 10.0 times) more likely not to improve in at least one cataract surgery outcome, including self perceived visual function, than people aged 50-64 years, after adjustment for ocular comorbidities and other factors.[20] The independent effect of age has been shown consistently in other populations.[4] The explanation of this phenomenon is not obvious but may be related to combinations of unrecognised or subclinical comorbidity, subtle age related effects on macular function, and the tendency of older people to perceive functional impairment irrespective of vision.[9 20]

Effectiveness

These data, although troubling, do not imply that very elderly patients do poorly. In one of few studies that looked specifically at people aged 85 and over, Lundstrom and colleagues showed that overall results were excellent; about 85% of patients had improved visual acuity and 87% perceived some benefit from the surgery.[19] Cataract extraction is therefore still a highly effective procedure for most elderly people.

Need for more focused research

Further research on cataract surgery outcomes that focuses on the very elderly population will provide more refined estimates of which groups of patients are most likely to derive benefit from cataract surgery. These studies should preferably be prospective, have objective and standardised documentation of visual and functional outcomes, and have well defined subgroups of patients with various comorbidities. An example of such a study was recently conducted by Armbrecht and colleagues, who examined the benefits and risks of cataract surgery in elderly patients with various severities of cataract and age related maculopathy.[25] Their findings identified subgroups of patients who might benefit from cataract surgery. Those with mild to moderate age related maculopathy and moderate cataract showed significant improvements in both visual function and quality of life. The benefits remained inconsistent, however, in those with more severe age related maculopathy and milder cataract. Similar issues on benefit versus risk for cataract surgery in elderly people with various severities of cataract and diabetic retinopathy and in those with systemic comorbidities should be evaluated. Only then can we formulate better clinical guidelines in the management of cataract in very elderly patients, and perhaps reliably address whether age should be a factor in future healthcare policies on cataract surgery.

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1 Spalton D, Koch D. The constant evolution of cataract surgery. *BMJ* 2000;321:1304.
2 Powe NR, Schein OD, Gieser SC, Tielsch JM, Luthra R, Javitt J, et al. Synthesis of the literature on visual acuity and complications following cataract extraction with intraocular lens implantation. Cataract Patient Outcome Research Team. *Arch Ophthalmol* 1994;112:239-52.
3 Desai P, Reidy A, Minassian DC, Vafidis G, Bolger J. Gains from cataract surgery: visual function and quality of life. *Br J Ophthalmol* 1996;80:868-73.
4 Norregaard JC, Hindsberger C, Alonso J, Bellan L, Bernth-Petersen P, Black C, et al. Visual outcomes of cataract surgery in the United States, Canada, Denmark, and Spain. Report from the international cataract surgery outcomes study. *Arch Ophthalmol* 1998;116:1095-100.
5 Desai P, Minassian DC, Reidy A. National cataract surgery survey 1997-8: a report of the results of the clinical outcomes. *Br J Ophthalmol* 1999;83:1336-40.
6 Minassian DC, Reidy A, Desai P, Farrow S, Vafidis G, Minassian A. The deficit in cataract surgery in England and Wales and the escalating problem of visual impairment: epidemiological modelling of the population dynamics of cataract. *Br J Ophthalmol* 2000;84:4-8.
7 Gray CS, Crabtree HL, O'Connell JE, Allen ED. Waiting in the dark: cataract surgery in older people. *BMJ* 1999;318:1367-8.
8 Taylor HR. Cataract: how much surgery do we have to do? *Br J Ophthalmol* 2000;84:1-2.
9 Westcott MC, Tuft SJ, Minassian DC. Effect of age on visual outcome following cataract extraction. *Br J Ophthalmol* 2000;84:1380-2.
10 Quigley HA. Mortality associated with ophthalmic surgery. A 20-year experience at the Wilmer Institute. *Am J Ophthalmol* 1974;77:517-24.
11 Petruscak J, Smith RB, Breslin P. Mortality related to ophthalmological surgery. *Arch Ophthalmol* 1973;89:106-9.
12 Duncalf D, Gartner S, Carol B. Mortality in association with ophthalmic surgery. *Am J Ophthalmol* 1970;69:610-5.
13 Hampl KF, Marsch SC, Schneider M, Flammer J. Vasovagal heart block following cataract surgery under local anesthesia. *Ophthalmic Surg* 1993;24:422-4.
14 Tufail A, Foss AJ, Hamilton AM. Is the first day postoperative review necessary after cataract extraction? *Br J Ophthalmol* 1995;79:646-8.
15 Schein OD, Katz J, Bass EB, Tielsch JM, Lubomski LH, Feldman MA, et al. The value of routine preoperative medical testing before cataract surgery. Study of medical testing for cataract surgery. *N Engl J Med* 2000;342:168-75.
16 McKibbin M. The pre-operative assessment and investigation of ophthalmic patients. *Eye* 1996;10:138-40.
17 Glantz L, Drenger B, Gozal Y. Perioperative myocardial ischemia in cataract surgery patients: general versus local anesthesia. *Anesth Analg* 2000;91:1415-9.
18 Bernth-Petersen P, Ehlers N. Cataract extraction in the "nineties." *Acta Ophthalmol* (*Copenh*) 1983;61:392-6.
19 Lundstrom M, Stenevi U, Thorburn W. Cataract surgery in the very elderly. *J Cataract Refract Surg* 2000;26:408-14.
20 Schein OD, Steinberg EP, Cassard SD, Tielsch JM, Javitt JC, Sommer A. Predictors of outcome in patients who underwent cataract surgery. *Ophthalmology* 1995;102:817-23.
21 Mittra RA, Borrillo JL, Dev S, Mieler WF, Koenig SB. Retinopathy progression and visual outcomes after phacoemulsification in patients with diabetes mellitus. *Arch Ophthalmol* 2000;118:912-7.
22 Wong TY. Cataract surgery in patients with cataract and age related macular degeneration: do the benefits outweigh the risks? *Br J Ophthalmol* 2000;84:1337-8.
23 Elam JT, Graney MJ, Applegate WB, Miller ST, Freeman JM, Wood TO, et al. Functional outcome one year following cataract surgery in elderly persons. *J Gerontol* 1988;43:M122-6.
24 Norregaard JC, Thoning H, Bernth-Petersen P, Andersen TF, Javitt JC, Anderson GF. Risk of endophthalmitis after cataract extraction: results from the international cataract surgery outcomes study. *Br J Ophthalmol* 1997;81:102-6.
25 Armbrecht AM, Findlay C, Kaushal S, Aspinall P, Hill AR, Dhillon B. Is cataract surgery justified in patients with age related macular degeneration? A visual function and quality of life assessment. *Br J Ophthalmol* 2000;84:1343-8.